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Subject: Pre- and Post-suppression Monitoring of Nepytia janetae on the Sacramento Ranger District

To: Forest Supervisor, Lincoln National Forest

Because so much of the background information on the *Nepytia janetae* outbreak has been documented in the specialist report I prepared for the "Environmental Assessment for *Nepytia janetae* Winter Defoliator Spray Project", this letter will focus on our larval population monitoring efforts conducted during the fall of 2007. Multiple visits to the affected area were conducted by staff entomologist, Terry Rogers, and myself during this time. Depending on the objectives of the sampling (spot-checking for larval presence vs. quantifiable measurements of larvae per square meter of foliage), the method varied from lower branch beating to mid-crown foliage sampling.

On September 11, 2007, Terry Rogers and I visited multiple sites on the Sacramento RD to monitor the status of the *Nepytia janetae* outbreak. In light of the completion of the Environmental Assessment and the signing of the Decision Notice for the spray project, we were particularly interested in sampling sites within the proposed treatment area. We timed this visit based on the results of our early September 2006 visit, at which time we observed that egg hatch had taken place and first instar larvae were abundant and distributing themselves throughout the host tree canopies. Since our September 11, 2007 visit was about ten days later than our 2006 visit, we felt confident that most egg masses would have hatched by then. While the developmental stage of the larvae we found was consistent with last year's observations, the numbers of larvae were dramatically reduced from 2006 levels.

To collect and count larvae, we used the lower crown branch beating technique, a method used by us previously for this species. White fir, Douglas-fir, southwestern white pine and ponderosa pine were sampled. We started by sampling sites above the Woodlands subdivision on NFS lands and found no larvae. We proceeded down Woodlands Way, stopping about a quarter of a mile from the uppermost limit of the subdivision. This site was selected since Terry had observed heavy larval presence there in the spring of 2007. At that site, five trees were sampled and a total of three larvae were collected. Similar results were obtained on NFS land near Big Daddy's restaurant (another site that last spring had high numbers of larvae). We proceeded to sample along Highway 244 near Highway 82, in Apache and Silver Campgrounds, and on Highway 244 one mile east of the Silver Recreation Area entrance. Outside the proposed treatment block, we sampled trees at Cathey Vista and along the Timberon Highway. Our results follow.

Table 1. Lower crown densities of *Nepytia janetae*, September 11, 2007.

Site	# of larvae	# of trees sampled	Average # larvae per branch
Upper Woodlands NFS	0	0	0
Middle Woodlands Subdiv.	3	5	.60
Big Daddy's Restaurant NFS	1	3	.33
Hwy 244 near Hwy 82	9	35	.26
Apache Campground	1	6	.17
Silver Campground	0	15	0
Silver Ampitheater	0	18	0
Hwy 244 East of Silver Entrance	0	15	0
Cathey Vista	0	20	0
Road to Timberon Substation	0	18	0

These values were greatly reduced from what was observed several months earlier. In order to address the possibility of a delayed egg hatch, Terry returned the following week and on September 19 sampled three points using lower branch beating along Highway 82 just east of the Village of Cloudcroft boundary, and found no larvae. He checked an additional site across from the Gravel Pit, northeast of the Village, and again found no larvae. A final stop in the Pines Campground yielded a density of 14.3 larvae per square meter of foliage.

I returned to Cloudcroft the following week and on September 26-27 conducted additional lower branch sampling to more fully assess the population throughout the proposed treatment block (Table 2.)

Table 2. Lower crown densities of *Nepytia janetae*, September 26-27, 2007.

Site	# of larvae	# of trees sampled	# larvae/m^2 foliage
Osha Trailhead	0	10	0
Trestle Trailhead	0	10	0
Highway 130 at Athletic Field	0	10	0
Deehead Campground	4	10	1.2
Sleepygrass Campground	16	10	4.8
Junction 130 & 6563	0	10	0
Junction 130 & Pierce Canyon	0	10	0
FS 5661, .3 mile from FS 24B	0	10	0

As you will recall, these data were posted with mapped locations at the public meeting held at the Cloudcroft High School the evening of September 27, where the proposed spray project was discussed.

On October 23 and 24, Terry and I returned to conduct a more quantitative pre-suppression sampling of the population to be used as a reference for the effect of the treatment. We sampled two branches per tree, five trees per site, using a pole pruner to clip branches from the lower

portion of the mid-crown (about 15 feet high). Those branches were measured, shaken into a cloth bag, and the dislodged larvae were counted. We sampled sites within and outside the treatment block so that treatment effects might be compared against natural decline factors operating on the untreated population. Unfortunately, no larvae were found outside the block. Fourteen days after the spraying, we returned to do our post-suppression sampling. We did not re-sample sites at which no larvae were found in the pre-suppression survey. While the uneven distribution of the larvae will account for some variation in sampling results, the high number of larvae observed after the treatment was somewhat surprising (Table 3). Finding more larvae after the treatment than before is certainly an artifact of sampling error; however, we feel comfortable in saying such a result indicates the treatment was less effective in Dale Ressler and Pines Campground than expected.

Table 3. Results of pre-suppression (October 23-24, 2007) and 14-day post-suppression (November 20, 2007) *Nepytia janetae* larval sampling.

Average larvae / m^2 foliage sampled		
Site	**Pre-suppression**	**Post-suppression**
Apache Campground	8.1	3.2
Dale Ressler	0.9	3.1
Deerhead Campground near shed & site 22	0.0	NS
FS 64 - 3.2 mi East of Sunspot Hwy Junction	0.0	NS
FS 64 - 3.9 mi East of Sunspot Hwy Junction	0.0	NS
FS 640 0.2 miles off 6563 - Out of Block	0.0	NS
Junction FS162 and Wofford Lookout Rd.	0.0	NS
Pines Campground	0.5	12.6
Sleepygrass Campsites 4 & 5	1.5	0.0
Sleepygrass Picnic 35 & 36	1.4	0.5
NS - Sites not sampled		

To address the possibility of a lapse in spray coverage, spray deposition cards which had been placed in the field during the aerial application were reviewed following the project. While deposition in the Pines Campground was light, the droplet size and distribution were well within acceptable range. No cards were placed at the Dale Ressler site. These results would lead us to believe that the high post-suppression counts are either a result of sampling error (larvae not being in the sampling zone at the time of sampling), or of the sprayed foliage not having been ingested by the larvae. The foliage of clipped branches was examined during the post-suppression sampling and evidence of recent feeding was observed. The larvae were mainly in the early third instar when the post-suppression sampling was conducted.

Jacques Dugal, the Foray® manufacturer's representative from Valent Biosciences, was on-site for the application and has been contacted regarding these results. He feels the small sample size

(two limbs per tree, five trees per site) may be to blame for the apparent lack of treatment effect in the two sites. He suggests the amount of defoliation observed in the spring might be a better measure of success.

During our monitoring of this insect over the past year, Terry and I have observed great variability in larval distribution within a tree, among trees within a site, and within the same site on different dates. Recall that Terry's September 19 spot-checking yielded a lower branch-beating result of 14.3 larvae per square meter of foliage at the Pines Campground, but during the pre-suppression mid-crown sampling on October 23, the larval density was only .5 larvae per square meter of foliage. The post-suppression mid-crown level of 12.6 larvae per square meter of foliage might have looked a little more favorable if the September 19 larval density had been observed during the pre-suppression sampling. Unexplained factors affecting larval movement upward and downward within the crown may also affect the results obtained with our sampling method, which is based on the techniques used for other conifer defoliators.

We believe the application of the insecticide was well-executed. The weather was very good during and following the application, so larval ingestion of the material should have taken place. Since the majority of sites having measurable population levels did see a reduction, it is very possible the treatment was successful. We will have to wait to see if there is a discernable reduction in foliar damage in the spring.

A full discussion of the outbreak, population trends, and treatment will be written in a formal report in the coming months. In the meantime, should you have any questions, please do not hesitate to call me.

/s/ Debra Allen-Reid
DEBRA ALLEN-REID
New Mexico Zone Leader, Forest Health

cc: Terry J Rogers
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